

ANTARCTIC OZONE HOLE SETS NEW RECORD

Observations of this year's "ozone hole" over Antarctica show an area greater at this time of the season than those previously observed, scientists at the Commerce Department's National Oceanic and Atmospheric Administration and the National Aeronautics and Space Administration reported today.

The "hole," a region of ozone depletion over Antarctica, is the result of complex chemical and meteorological processes occurring in the stratosphere. This year's ozone hole is the largest observed since it first developed in the early 1980s.

This year's hole, currently about 26 million square kilometers, is larger than the area of North America. It has been this size for the past few weeks. Last year at this time the hole was as much as 19 million square kilometers.

Values of the amount of ozone over a large portion of Antarctica are currently about 100 Dobson Units, compared with an average global value of about 330 Dobson Units. A Dobson Unit is a quantity used to define the amount of ozone in a column directly over the surface of the Earth at a given location.

The scientists also report that average atmospheric temperatures at an altitude of 20 kilometers above the region are among the lowest observed in the past 20 years. These low temperatures lead to the creation of polar stratospheric cloud particles, which are necessary for ozone destruction by chemicals to take place.

NOAA scientists use satellite instruments and balloons to measure the ozone hole. The satellite measurements were made with the Solar Backscatter Ultra-Violet instrument on the NOAA-14 environmental satellite. NASA scientists obtained their data from the Total Ozone Mapping Spectrometer (TOMS) instrument aboard NASA's Earth Probe satellite.

"Understanding depletion of the atmosphere's ozone is a serious issue for the international scientific community," said Walter Planet, a physicist at NOAA's National Environmental Satellite, Data, and Information Service. The increased amounts of ultraviolet radiation that reach the Earth's surface because of ozone loss have the potential to increase the incidence of skin cancer and cataracts in humans, harm some crops, and interfere with marine life.

Since the ozone hole was first observed, the United Nations Montreal Protocol on Substances that deplete the Ozone Layer was adopted in 1987. The Montreal protocol and subsequent amendments were adopted to reduce the amount of ozone-depleting chemicals released into the atmosphere. Continuous observations over the next decades will be necessary to monitor the atmosphere to detect changes in the amount of ozone, Planet said.

NOAA's measurements of the vertical ozone profile with balloons at the South Pole indicate that the September ozone decrease in the altitude region where the ozone hole forms (seven to 13 miles) occurred at a rapid rate similar to recent years, and reached near record low values in early October, said Dave Hofmann, director of the Climate Monitoring and Diagnostics Lab in Boulder, Colo.

"The 7 to 13-mile region of the atmosphere contains polar stratospheric clouds in winter, which are necessary for the unusual chlorine-related ozone destruction which occurs following sunrise in spring. More clouds form when the stratosphere is colder and 1998 was one of the colder years on record. The most likely reasons for the stratosphere becoming colder on average are related to climate change and the loss of ozone which acts as a heater as it absorbs harmful solar ultraviolet radiation while protecting the biosphere," Hofmann said.

According to Hofmann, in 1993, ozone in the 7 to 13-mile altitude range nearly disappeared and the amount of ozone overhead at the South Pole dropped to 86 Dobson Units on October 12. This year by October 1, total ozone had dropped to about 97 Dobson Units, the lowest value recorded at the South Pole with the exception of 1993. During the last several years, ozone depletion has extended to higher altitudes as chlorine has increased slightly and temperatures have fallen.

Hofmann says that as a result of the Montreal Protocol which limits the release of human-made, ozone-destroying halocarbons (such as CFCs), the stratospheric concentration of the chlorine from these substances is near the maximum value it is expected to reach. With chlorine nearly constant, year to year variations in temperature, which affect the rate of the chemical reactions, will be the dominant factor in determining variations in the magnitude of the ozone hole, especially its geographical and vertical extent which were larger this year than previously observed.

However, the depth of the ozone hole is not expected to change substantially because nearly all the ozone is already being destroyed in late September and early October over the critical 7 to 13-mile polar stratospheric cloud region. According to the WMO/UNEP 1998 Assessment of Ozone Depletion, which will be available early next year, the Antarctic ozone hole will remain severe for the next 10 to 20 years. Following this period a slow healing is expected with full recovery predicted to occur in the 2050 time frame. Climate change, which is predicted to include a colder stratosphere, will affect the rate of recovery, Hofmann said.

The National Oceanic and Atmospheric Administration has placed an image of this year's ozone hole over Antarctica on the World Wide Web. The address is: <http://nic.fb4.noaa.gov/> Click onto Stratosphere. Then click onto Daily Total Ozone NOTE: All NOAA press releases, and links to other NOAA material, can be found on the Internet at <http://www.noaa.gov/public-affairs>.